Art-based Rehabilitation Training Program

for stroke survivors

Kingston Stroke Symposium

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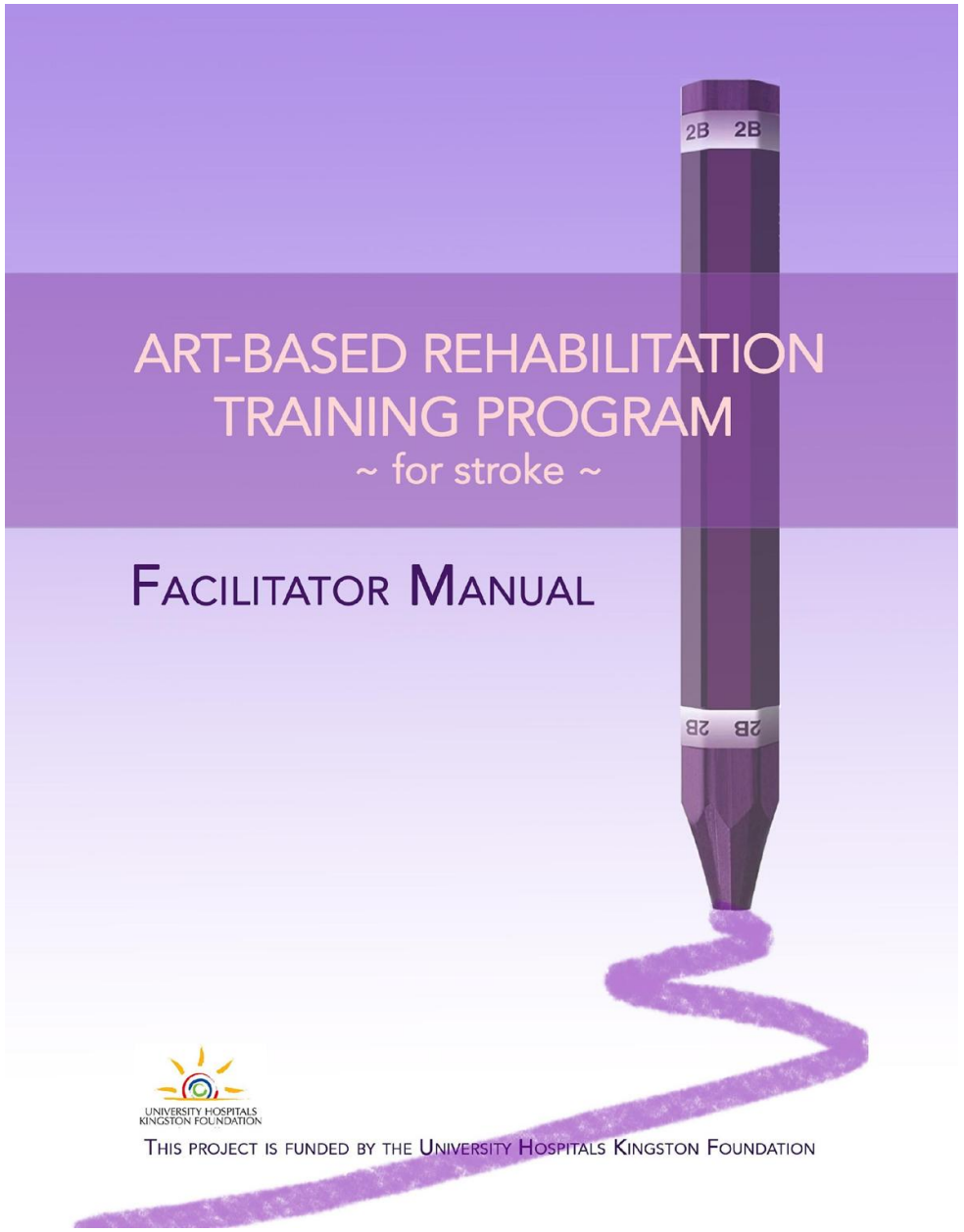
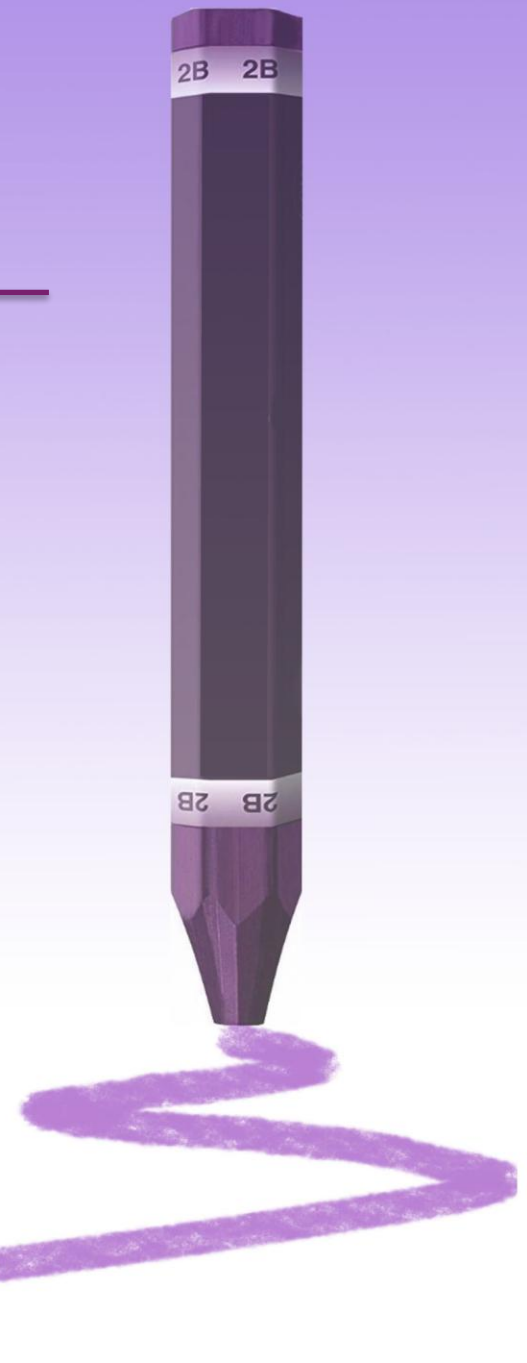
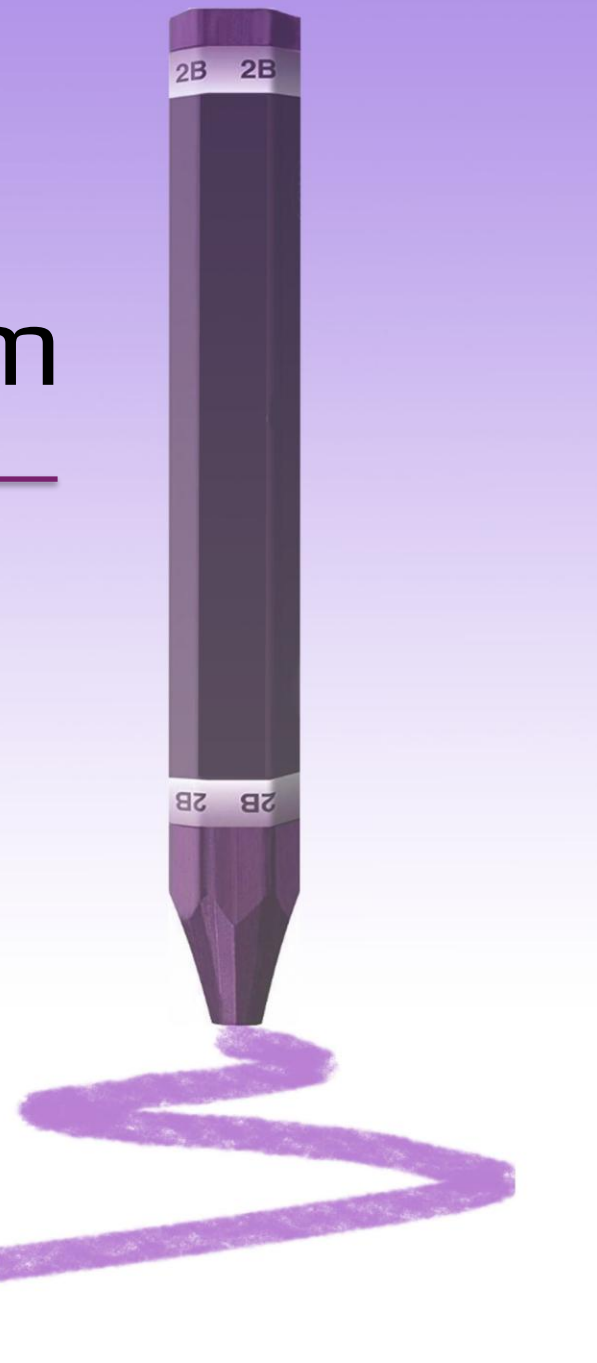


Agenda

- The evidence: literature review
- The ART Program
- Benefits
- Why ART is important for stroke
- History
- Inpatient Program
- Community Programs – Loyalist College Study
- What's Next?



Evidence Supporting the Program



Effects of enriched rehabilitation (ER) on cognitive function & serum glutamate levels post stroke:

- Elevated glutamate levels in patients with Post Stroke Cognitive Impairment (PSCI) correlate with poor cognitive outcomes
- Study: Enriched rehabilitation (ER) vs. conventional medical (CM)
- Outcomes: ER group showed enhanced cognitive function, reduced glutamate level compared to CM group

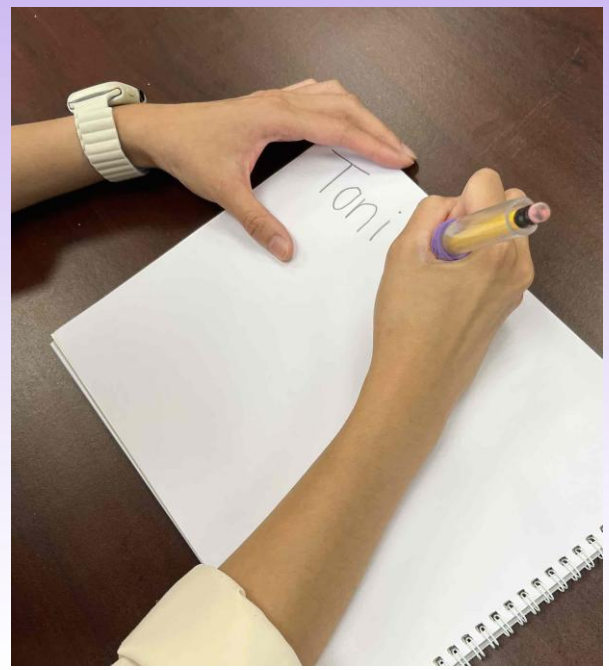
(Wang, X. et al., 2022)

Drawing on the right side of the brain: a voxel-based morphometry analysis of observational drawing:

- Study: Compared artists' vs. non-artists' brains and found consistent differences in neural structures
- Outcomes: Drawing ability correlates to changes in structures pertaining to fine motor control and procedural memory whereas
- Artistic training, in addition, is associated with enhancement of structures pertaining to visual imagery

(Chamberlain, R. et al., 2014)

The Art-based Rehabilitation Training Program

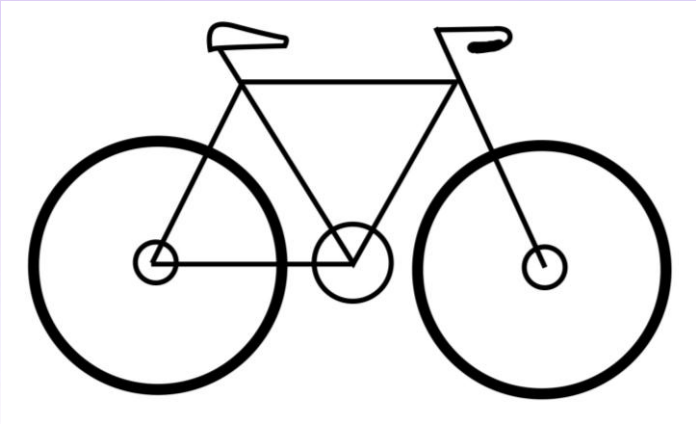


Bilateral Upper Limb Intervention:

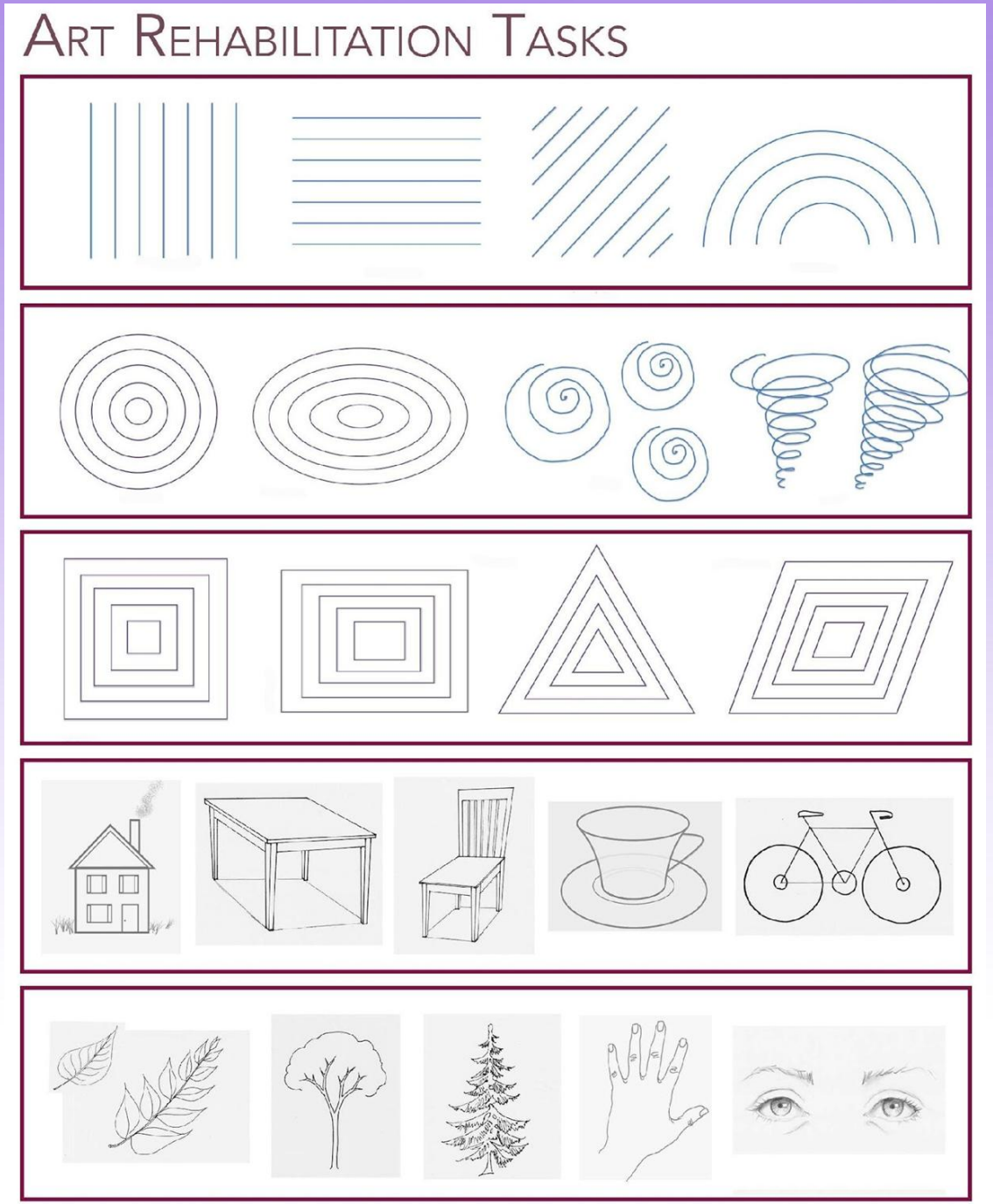
- Task-Oriented
- 1 hr – 3X week, 2-3 weeks
- Passive Learning: action observation
- Active Learning: write, trace, draw
- Repetitive movements

Task Progression

- Incremental image building
- Simple to complex
- Recall shapes



The act of drawing is a complex discipline, involving multi-sensory domains, motor and cognitive processes



Why ART is important for stroke recovery

- Bridges rehabilitation gaps
- Augments intensity, frequency & duration
- Transferable to Activities of Daily Living (ADLs)
- Addresses ‘learned non-use’
- Encourages self directed practice
- Alleviates boredom

KNOWN BENEFITS:

ORGANIZATION:

- Minimal cost
- Low tech
- Non-invasive
- Safe
- Easy setup & take down
- Volunteers & students

PATIENT:

- Motivational
- Challenging
- Purposeful
- Develops life skills
- Confidence building
- Enjoyable

POTENTIAL BENEFITS:

MOTOR FUNCTION:

- Hand-eye coordination
- Gross & fine motor skill development
- Grasp & release
- Strengthening
- Detection & correction

COGNITIVE:

- Connectivity
- Learning
- Procedural & episodic memory
- Planning, initiating & executing tasks
- Extrinsic feedback

SENSORY:

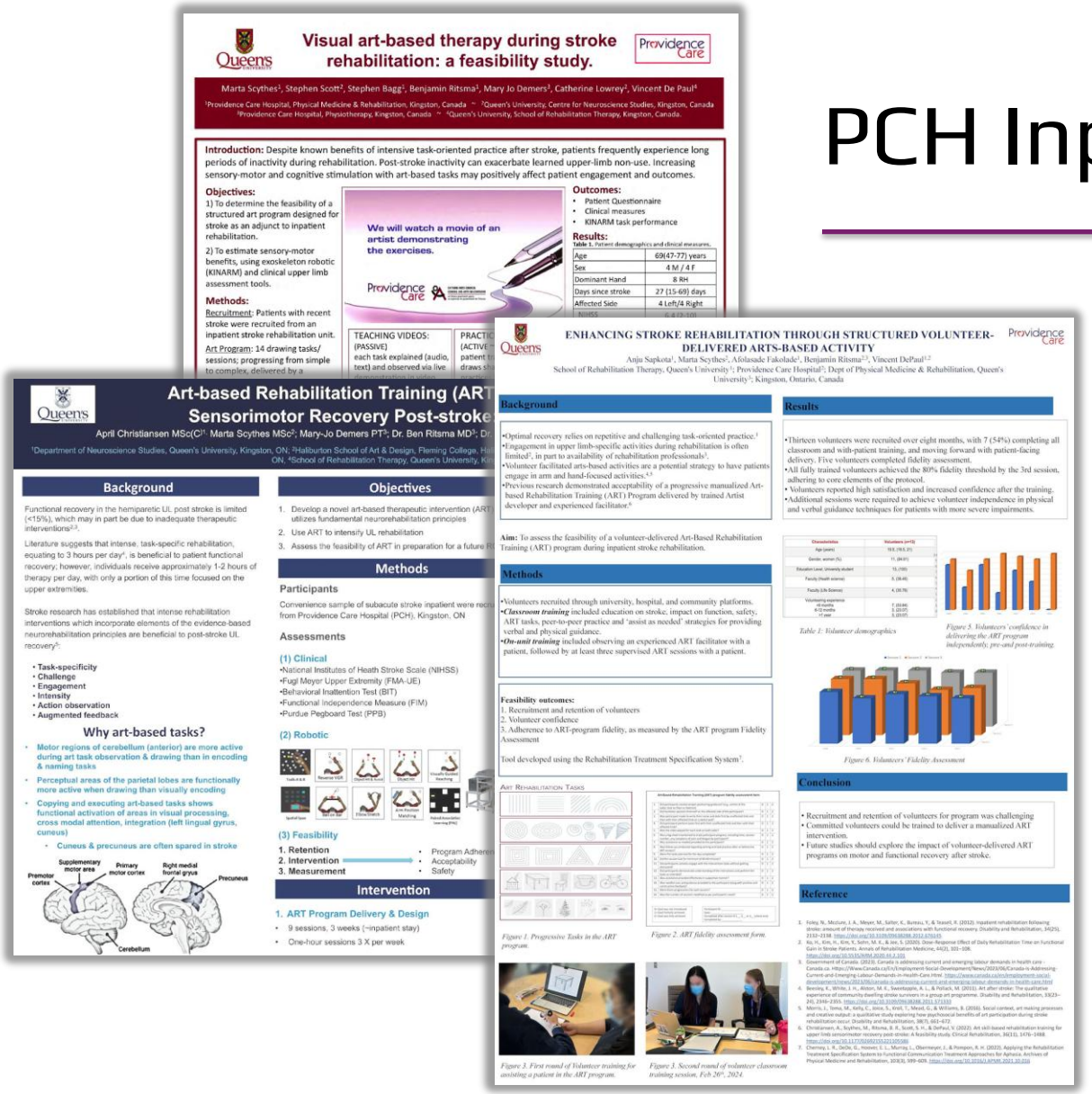
- Attention
- Visual scanning
- Proprioception
- Tactile
- Auditory

Testimonials:

“ART is making my writing better. The ‘pressure applied’ while writing seemed faded earlier but now I feel it’s improving and getting better. After my stroke, suddenly I realized I can’t write and that was really discouraging, but now I can see it is getting better.”

“very helpful for hand movement & brain stimulation.”

“Until this program I did not realize how much function I had lost due to the CVA - now I know how to go about regaining some of that function.”



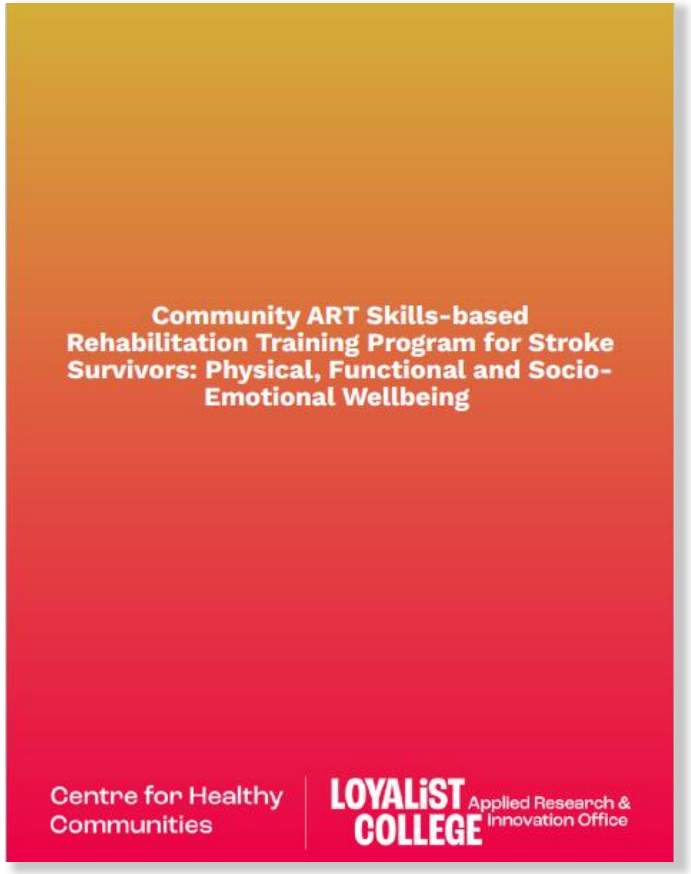
PCH Inpatient studies:

Feedback Questionnaires :

- Very satisfied with program
- Motivated to use both hands
- Noticed improvement
- Recommend to other stroke survivors

ART-based Rehabilitation Training with Stroke Survivors Living in the Community

- Can an ART-Based Rehabilitation Program meaningfully support ongoing recovery in the chronic phase of stroke?
- Can this model be sustainably delivered in the community while simultaneously supporting student learning?



Effects of task-oriented training (TOT) on UE functional performance in patients with sub-acute stroke, a RCT:

- Study: control received regular training, experimental TOT
- Tasks: ADL and stretching, strengthening exercises
- Mid study: after 2 weeks (10 hrs) TOT group showed significantly more improvements, in all outcomes, than control group

(Thant, A. et al., 2019)

Neuro rehabilitation principles were considered in the design of the Art Program

- Intensity of training
- Task-oriented practice
- Challenge
- Engagement
- Action observation

(Christiansen et al., 2022)

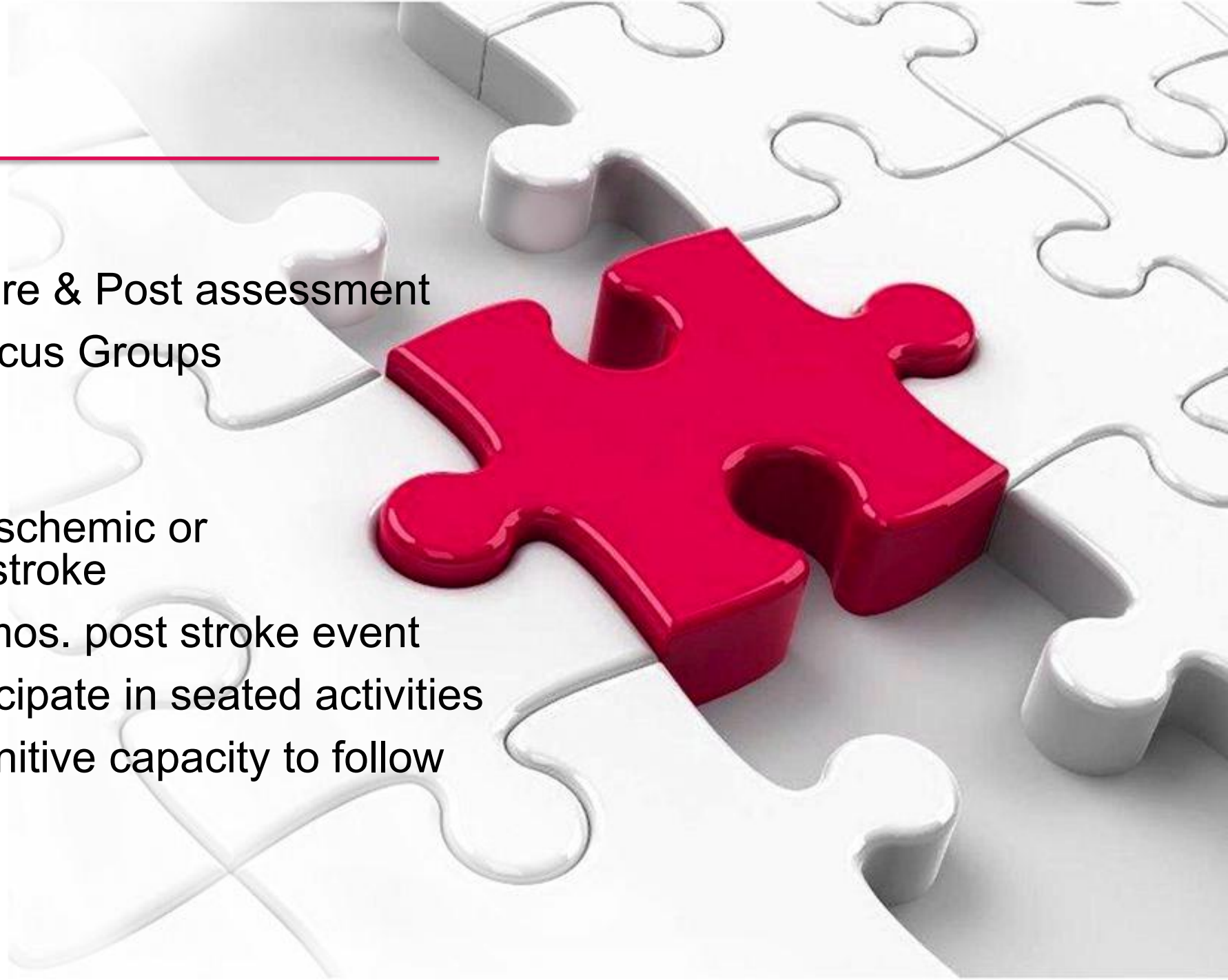
Methods

Mixed methods

- Quantitative: Pre & Post assessment
- Qualitative: Focus Groups

Inclusion criteria

- Diagnosis of ischemic or hemorrhagic stroke
- More than 6 mos. post stroke event
- Ability to participate in seated activities
- Sufficient cognitive capacity to follow instructions



Quantitative Pre & Post Results

Session One

Table 4. Results for Session One

Assessment	Participant 202401		Participant 202402		Participant 202403	
Purdue Pegboard Test	Pre	Post	Pre	Post	Pre	Post
Right Hand	10	13	10	8	12	14
Left Hand	0	0	7	11	0	0
Assembly	5	3	5	3	4	2
Chedoke McMaster						
Shoulder Pain	Slight decrease		No change		Increased pain	
Postural Control	Stable		Slight Improvement		Slight Improvement	
Arm	No improvement		Moderate improvement		No Improvement	
Hand	No Improvement		Slight Improvement		No Improvement	
Stroke Impact Scale						
Physical Strength	No change		Slight Decline		No change	
Cognitive Function	Some improvement		Slight Improvement		Small Improvements	
Emotional Well-being	Mostly stable, slight decline in enjoyment		Noticeable emotional improvements		Sadness increased; enjoyment decreased	
Communication	Mostly stable		Improved ability to say names and reply		Small improvements	
Daily Activities	Minor improvements		Minor improvements		Improvement in Dressing	
Mobility & Balance	Stable		Decline stair mobility		Some mobility improvements	
Hand Function	Slight Improvement		Improved hand use		Mixed results	
Social Participation	Small Improvements		Mostly stable		Improved work limitation	
Self-Reported Recovery	Significant Improvement		Slight Decline		No change	
Edinburgh Handedness						
Hand preference	Right	Right	Right	Right	Right	Right

Session Two

Table 6. Results for Session Two

Assessment	Participant 202401		Participant 202402	
Purdue Pegboard Test	Pre	Post	Pre	Post
Right Hand	12	17	0	0
Left Hand	9	16	11	12
Assembly	4	4	2	2
Chedoke McMaster				
Shoulder Pain	Slight decrease		Slight decrease	
Postural Control	Stable		Stable	
Arm	Stable		Stable	
Hand	No Improvement		No Improvement	
Stroke Impact Scale				
Physical Strength	Slight Improvement		No change	
Cognitive Function	Some improvement		Slight Improvement	
Emotional Well-being	Mostly stable, no emotional change		Mixed results: improvement in feeling like a burden, slight increase in hopelessness	
Communication	Improved naming, stable replying		Improved comprehension, stable conversation	
Daily Activities	Slight improvement in cutting food		Minor improvements cutting food	
Mobility & Balance	Stable		Some Improvements	
Hand Function	Slight improvement in strength		Significant hand function improvement	
Social Participation	Small improvement		Some improvement in work limitation	
Self-Reported Recovery	No change		N/A	
Edinburgh Handedness				
Hand preference	Right	Left	Left	Left

Modest but meaningful improvements:

- Cognition
- Emotional wellbeing
- Functional activities
- Gains in arm & postural control

Physical challenges:

- Shoulder pain
- Fatigue

Qualitative Results – Focus Groups

Physical wellbeing

"[my] left hand got easier"

"movement, [I now have] some"

"[the] range of movement felt more comfortable as it went on… [the] tone in [my] fingers has gone"

Functional wellbeing

"[I am] starting to visualize using my left hand" "

"[I feel] stronger with my right [hand]…persevering in my left [hand]"

"coordination is better in both hands"

Social-emotional wellbeing

"The harder it [the tasks] got…[I] would give up easily"

"I felt alone."

"[it] gives me something to look forward to…I look forward to coming"

Qualitative Results – Focus Groups

Social interaction

"[I] felt more connected"

"[I] enjoyed the group atmosphere"

'[its] nice to get out of the house"

"[it was] limited due to my aphasia…getting better"

Overall experience

"I sleep all the time after the session"

"I used to be tired, now I'm so active"

"would have felt differently one-to-one [sessions]"

"I enjoyed the group atmosphere…I never felt rushed"

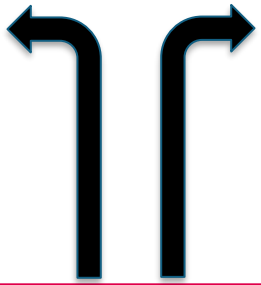
Outcomes

Quantitative Outcomes (Standardized Measures)

- Cognitive improvements common
- Modest functional gains
- Variable emotional change
- Improved social participation

Qualitative Themes (Participants Perspective)

- Improved hand coordination
- Functional re-engagement
- Mixed emotions
- Strong group connection



Integrated interpretation

ART participation supports holistic recovery

Even when physical gains are modest, meaningful improvements in cognition, social engagement, and motivation enhance perceived recovery participation

Students and Intra-professional Learning

- Work-Integrated Learning Model
- Community-based Rehabilitation Exposure
- Mutual Benefits and Sustainability

What's next?

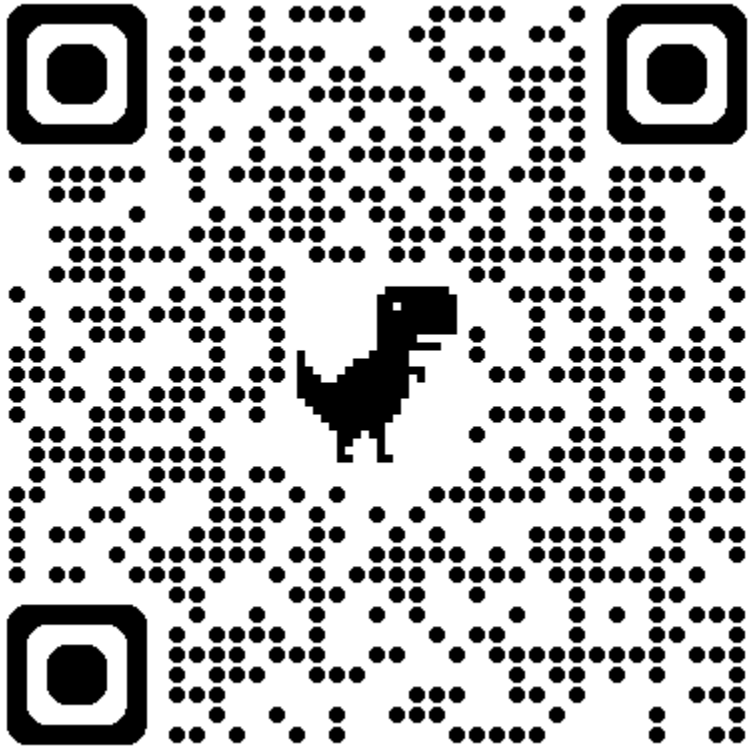
Kingston:

- Inpatient group study
- Providence Transitional Care Centre (PTCC)
- Outpatient Rehabilitation
- PCH Extern Initiative

Regional growth:

- College Therapy Assistant Programs
- Online programming (multi-lingual)

ART-based rehabilitation training patient videos QR Code



Thank you!

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